

THURSDAY, JUNE 2, 1881

## ARCTIC ECHINODERMATA

*A Memoir on the Echinodermata of the Arctic Sea to the West of Greenland.* By P. Martin Duncan, F.R.S., and W. Percy Sladen. Pp. 82, Six Plates. (London: Van Voorst, 1881.)

MESSRS. DUNCAN AND SLADEN will receive the thanks of zoologists for the publication of this memoir, which will owe its importance as much to the care with which it has evidently been prepared, as to the interest of the group with which it deals, and the value that it has in being a monograph of a definite zoological region. The time would, indeed, seem to have come when no further question is possible as to the existence of a characteristic circumpolar fauna; nearly ten years ago Prof. Alex. Agassiz directed attention to the wide distribution of that common form, which has unfortunately so very long a name, the regular Echinid—*Strongylocentrotus drobachiensis*, in his "Revision of the Echini," and the researches of Mr. Seeböhm have led him to a similar conclusion as to the circumpolar distribution of Birds. Further evidence is given by the present authors, who sum up the matter thus:—

"When these details are carefully considered, it becomes evident that each one of the great groups of Echinodermata tells the same story regarding distribution. The fauna, as a whole, is not an extension northwards of species from more temperate climates, but is essentially circumpolar."

Where the range is so wide considerable variations are to be expected in the characters of the species, and we feel inclined to attach as much importance to the accounts which the authors give of the variations they have been able to observe as to their technical zoological definitions of the species. We have been unable to find in the memoir any notice of the number of specimens which were accessible to the authors, but we believe it was quite large enough to have made the account of varietal forms a necessary part of a complete account.

It was, at any rate, large enough to make the number of new species very small; a new *Antedon*, a new member of Sars' interesting genus *Pedicellaster*, to which Mr. Sladen has given the appropriate name of *palæocrystallus*, make up, with an Ophiurid described by Prof. Duncan, the sum of our gains in that direction. So striking were the characters of this Ophiurid that it was found necessary to form a new genus for its reception; curiously enough Dr. Duncan proposed a generic term—*Luethenia*—which has already been twice used in zoology; but this was a matter of slight importance, as Messrs. Koren and Danielsen had the priority in recognising the generic distinction of the Ophiurid in question, and of giving it the name of *Ophiopleura*. This priority was however merely a matter of months, and not of years, as the English naturalist would lead us to imagine by leaving uncorrected in his proof the date of 1867 for 1877 (see *tom. cit.* p. 54). Dr. Duncan holds to the view he expressed in 1878 that the form has affinities with *Amphiura* and *Ophioglypha*; what Prof. Lyman's views are it is impossible to state very definitely, but from the position which he has given to *Ophiopleura* in his lately-published

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"Preliminary List," it would seem that he attaches greater importance to its Ophioglyphan than to its Amphiuran characters.

We are not quite sure that we should agree with some of Mr. Sladen's views on nomenclature; but it is, we fear, too late now to raise a protest against the use of the term *Asteracanthion*; as the genus to which the name is applied has some eighty constituent species, it would be a matter of satisfaction if of the parties who use *Asteracanthion* or *Asterias* one or other would yield to the arguments adduced by the others. We must confess that for ourselves the latter term appears to have every advantage both of right and of convenience over the more unwieldy title of Müller and Troschel. It is much more satisfactory to direct attention to the way in which the authors have grappled with an old and unknown synonym in the case of *Astrophyton Agassizii*. In the year 1819 Dr. Leach applied the specific term *arcticus* to a specimen of "*Gorgonocephalus*" brought home by Sir John Ross; the definition of this species was too ambiguous and short for practical purposes, and it was not until Stimpson described the Invertebrates of the Grand Manan that the Arctic form got the name by which it has since been called by every naturalist who has had occasion to mention it; Lyman, Verrill, Ljungman, Lütken and Norman have all known it as *Astrophyton Agassizii*. The specimen which is supposed to be the type of Leach's description has no title attached to it, or any known history; in other words, it can never be *known* what Leach meant to describe, though it is easy enough to *guess*; under these circumstances (by detailing which the authors take, as we hope, the wind out of any mere bibliographer's sails), "we do not feel justified in restoring Dr. Leach's name."

This is an eminently satisfactory conclusion; ill-drawn definitions and unlabelled or wrongly-labelled specimens have had their day, and a good long day has it been, in hampering the progress of a growing science; if zoology is to advance with the other branches of biology, a purist sense of justice must not step in and lead us continually away from the real business of natural history to the dryasdust occupation of elaborating synonymical lists. A dictator-speaker and some rules of urgency might well be invented in the interests of zoological progress.

The six plates, on which twenty-six of the thirty species described in this volume are carefully figured, make a very useful addition to a work which the Government Grant Fund of the Royal Society were fully justified in subsidising.

F. J. B.

## GREEK GEOMETRY

*Greek Geometry, from Thales to Euclid.* Part II. By G. J. Allman, LL.D. Extracted from "*Hermathena*," Vol. iv. No. vii. 49 pp. (Dublin: University Press, 1881.)

IN NATURE, vol. xviii. p. 291, we briefly referred to the first part of Dr. Allman's work, which gave an account of the earlier geometers, more especially treating of the labours of Thales and Pythagoras. The opening years of the fifth century before the Christian era were very dark ones for Greece, but "then followed the glorious struggle."

... A solid basis was thus laid for the development of

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Greek commerce and for the interchange of Greek thought, and a brilliant period followed—one of the most memorable in the history of the world." Athens became the centre of all intellectual movement. To her—the Athens of Pericles—came Hippocrates of Chios, and "in this city geometry was first published."

Our author agrees with Hankel (against Proclus) as to the important influence of the Eleatics (Parmenides and Zeno), "not only on the development of geometry at that time (circ. 450 B.C.), but further on its subsequent progress in respect of *method*." Clairaut, in his "Elements of Geometry" (recently translated by Dr. Kaines, the original text is cited by Dr. Allman), notices this influence in the case of Euclid. The paradoxes of Zeno led to the banishment of the Infinite (which plays so important a part in the modern treatment), "the infinitely small as well as the infinitely great." What Hippocrates may very fairly be supposed to have done in relation to the squaring of the circle is, we think, well put. "Simplicius has preserved in his 'Comm. to Phys. Ausc.' of Aristotle a pretty full and partly literal extract from the 'History of Geometry' of Eudemos." It is to Bretschneider we owe a careful revision and emendation of this fragment, and our author has skilfully attempted to determine what is Simplicius and what is simply Eudemos in this account. It is curious that Bretschneider merely notices the "circumstantiality of the construction and the long-windedness and the over-elaboration of the proofs," and Hankel expresses surprise that this fragment, "150 years older than Euclid's Elements, already bears that character, typically fixed by the latter, which is so peculiar to the geometry of the Greeks." Had the present pamphlet been confined to the elucidation of this single matter it would have had a sufficient *raison d'être*.

The next geometer whose contributions to geometry are determined and discussed is Democritus, more usually regarded as a philosopher. At this stage, too, our author takes stock, and shows that the progress made in this (about) half-century interval since Pythagoras mainly "concerns the circle."

We note the connection of the name of Hippocrates with another of the famous problems of antiquity, viz. the duplication of the cube: he seems to have been the first to reduce this question to the finding of two mean proportionals between two given straight lines, the greater of which is double the less. Many interesting particulars are given in connection with this problem. The general problem is stated to have been first solved by "Archytas of Tarentum, then by his pupil Eudoxus of Cnidus, and thirdly by Menæchmus, a pupil of Eudoxus"; this last used "the conic sections which he had discovered." A third problem, the tri-section of an angle, also came to the front about this time. Dr. Allman fully discusses this also, and shows that it was one which was fairly within the reach of a Pythagorean. Montucla however attributes to Hippias of Elis, a contemporary of Socrates, the invention of the quadratrix (the quadratrix of Dinostratus), by means of which (in a quite different way from Sylvester's Fan) an angle can be not only trisected, but divided into any number of equal parts. Allman sides with Hankel and shows the improbability of Hippias being the inventor, but he is against him when he refers the method of exhaustions to Hippocrates of Chios. It will have

been seen that the great geometer of this period is Hippocrates, "who seems to have attracted notice as well by the strangeness of his career as by his striking discovery of the quadrature of the lune." The unfavourable statements of Aristotle, Eudemos, Jamblichus, and Eutocius are examined, and part of the summing up is, "We may fairly assume that Hippocrates imperfectly understood some of the matter to which he had listened; and that, later, when he published what he had learned, he did not faithfully render what had been communicated to him."

An examination of this pamphlet still further shows that the writer, while carefully using the recent works of Bretschneider, Hankel, Cantor, and others, has himself gone over the original authorities and formed his own opinions upon the difficult questions that turn up. It is, in our opinion, a most valuable contribution to the subject, and we shall be glad when the piecemeal work in "Hermathena" is done, and the book appears, as we believe it is the writer's intention that it should appear, in proper book form as one work.

### OUR BOOK SHELF

*The Zoological Record for 1879.* Being Volume Sixteen of the Record of Zoological Literature. Edited by Edward Caldwell Rye, F.Z.S. (London: John Van Voorst, for the Zoological Record Association, 1881.)

THE editor's promise to the members of the Zoological Record Association has been kept, and the *Record* for 1879 was published in the month of April in this year. We gladly note in addition his confident expectation that the *Record* for 1880 will be published ere the present year ends. This sixteenth volume contains nearly 700 pages of well-condensed records of the literature of zoology of 1879. The lion's share of the hard work has fallen to Mr. W. F. Kirby, who, with Mr. McLachlan, records the literature of the Insecta. The Rev. O. P. Cambridge gives the record of the Arachnida for 1878 and 1879. The Vermes and Echinoderms are done by Prof. Jeffrey Bell, and the Coelenterata and Protozoa are elaborated by A. G. Bourne, S. J. Hickson, and Stuart Ridley. The works on the Mammals are recorded by W. A. Forbes; on the Birds by Howard Saunders; on the Reptiles and Fishes—alas! that we should have to write it—by the late gifted A. W. E. O'Shaughnessy. Prof. E. von Martens still records the literature of the Mollusca and Molluscoidea, the only recorder still remaining as such of that small group who came to the assistance of Dr. Günther in 1864. We miss from last year's list of recorders Dr. C. Lütken, who served during his seven years well and faithfully; in him knowledge and experience of the subject he worked at were combined with much tact. The British Association, the Royal Society, and the Zoological Society of London have, as is now usual, handsomely assisted in aid of the publication of this most useful volume.

The most useful index to new genera and sub-genera seems most carefully done. The list of new genera is for the year almost 1000; so that evidently the zoological kingdom is not as yet worked out.

*Wiltshire Rainfall, 1880.* (Marlborough: C. Perkins and Son, Times Office).

THE compilers of this carefully-printed and, for the class of publications, luxuriously got-up annual merit our hearty commendation for the general excellence of the work thus put before us. From its physical geography Wiltshire forms a well-marked rainfall region, it being a little to the north of the centre of the county that the two Avons and several tributaries of the Thames take their rise. From this plateau the country slopes northward to the